

Measurements to Determine Land-mobile Radio Channel Occupancy in the Washington DC Area

In an effort to by the National Telecommunications and Information Administration (NTIA) to improve the spectrum efficiency of Federal radio usage, Land Mobile Radio (LMR) channel occupancy measurements were conducted and analyzed in order to realistically design future possible shared trunked systems for Federal radio users. Channel occupancy measurements in the federal land mobile bands have not been made during the last 15 years, and actual usage trends up to this point were completely unknown – even to the point of not knowing whether usage was increasing or decreasing. Measurements in October, 2004 of actual radio traffic in LMR frequency bands in the 138 - to 174-MHz range and the 406- to 420-MHz range will provide information necessary for making those decisions. A formal report is scheduled for publication and release in the early part of 2005.

This paper discusses the specialized techniques and methods used for performing those measurements and analyzing the data. By digitizing 5-6 MHz of spectrum, performing signal processing, and data compression on a commercially available spectrum analyzer it is possible to obtain occupancy data on as many as 480 LMR channels every 200 ms. This is a significant improvement over earlier techniques. Using probability distributions of LMR and noise data, in combination with various processing techniques it is possible to determine the presence of signals with a predictable degree of certainty against the noise background.

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